# AVC-1450

## VIDEO CAMERA

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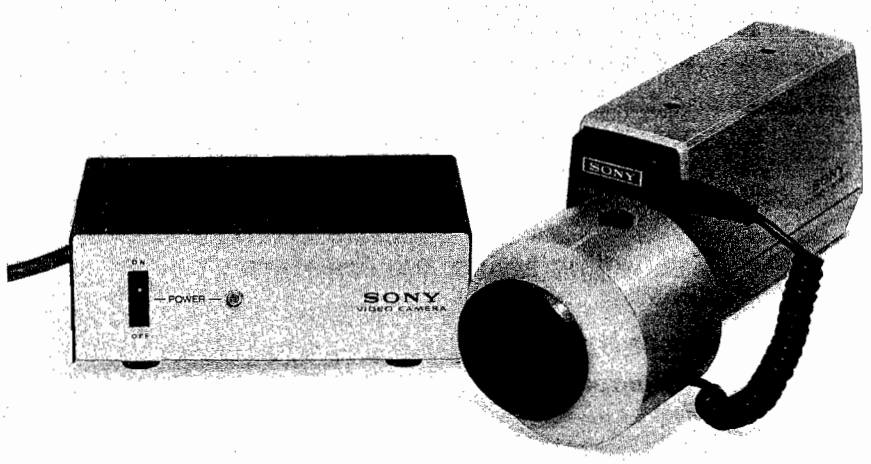
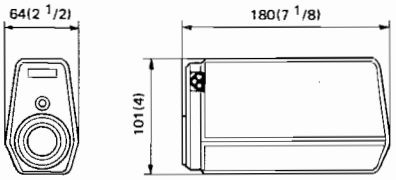


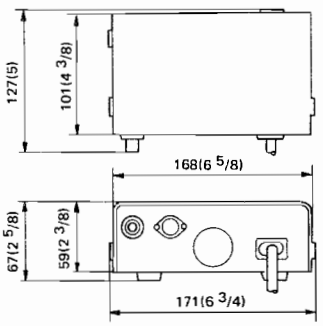

## SPECIFICATIONS

| | |
|---|---|
| **Pickup tube:** | 2/3-inch, electrostatic focus, electromagnetic deflection TYPE E5195, S4102 |
| **Scanning system:** | 525 lines/frame, 30 frames/sec |
| **Sync:** | Internal 2 : 1 interlace sync generator |
| **Resolution:** | More than 450 lines at center<br>More than 350 lines at corners |
| **Scanning frequency:** | H 15,734 Hz; V 59.94 Hz |
| **Minimum illumination:** | 1 Lux |
| **Automatic sensitivity control range:** | 10 ~ 100,000 Lux<br>(with E-E AUTO IRIS LENS) |
| **Video output:** | 1.0 V(p-p) sync negative<br>75 ohms unbalanced |
| **Signal-to-noise ratio:** | Better than 44 dB |
| **Power requirements:** | AC 120 V 60 Hz |
| **Power consumption:** | 13W |
| **Operating temperature:** | 23°F – 113°F<br>(–5°C – 45°C) |
| **Lens mount:** | Standard "C" mount |
| **Weight:** | Camera head<br>0.95 kg (2 lb 2 oz)<br>Power unit<br>1.5 kg (3 lb 5 oz) |

| | |
|---|---|
| **Accessories supplied:** | CCF cable 5 m (16.4 ft)<br>75 ohm coaxial cable 1.5 m (4.9 ft) |
| **Optional:** | E-E automatic iris lens (JF1614EA-II)<br>CCF cable (CCF-5, 10, 25, 50) |
| **Dimensions:** | Camera head |




Power unit




Units: mm (inches)

SONY®

SERVICE MANUAL

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# SECTION 1
# ALIGNMENT

## 1. PRECAUTIONS

The following precautions should be observed to prevent damage to the pickup tube. Take good care. The high sensitivity tube employed in this camera is far expensive than ordinary type tube.

1. Do not subject the pickup tube to excessive jarring or mechanical shock.
2. Before applying the power to a defective camera of unkown condition, cut off the beam by turning the semifixed resistor (R2) BEAM Control, fully counterclockwise, looking from the printed pattern side of the PA-1 circuit board.

## 2. DISASSEMBLY

### 2-1. Camera Head Unit Disassembly

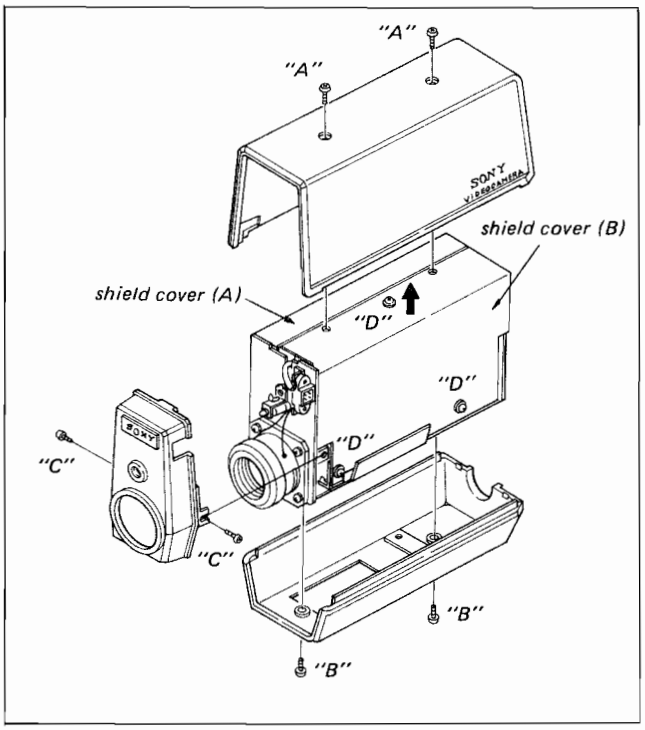



*Fig. 2-1. Camera head unit disassembly*

1. Remove the lens from the camera.
2. Remove two screws "A" shown in Fig. 2-1 securing the upper cover and remove the cover.
3. Remove two screws "B" holding the lower cover and remove the lower cover.
4. Remove two screws "C" securing the front cover on its both sides and remove it.
5. Remove five screws "D" holding the shield covers. Remove shield cover (B) first in the direction shown by the arrow. Then remove shield cover (A) in the same direction.
6. The PA-1 and the DR-1 Boards can be opened 90° for easy access to the parts/components.

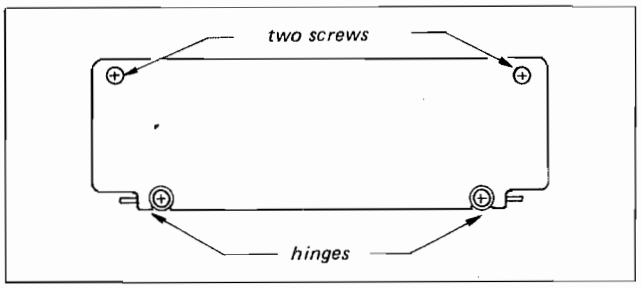



*Fig. 2-2. PA-1/DR-1 boards*

As the two screws fastening the board at its upper sides both circuit boards can be opened around the hinges as shown in Fig. 2-2.

### 2-2. Power Unit Disassembly

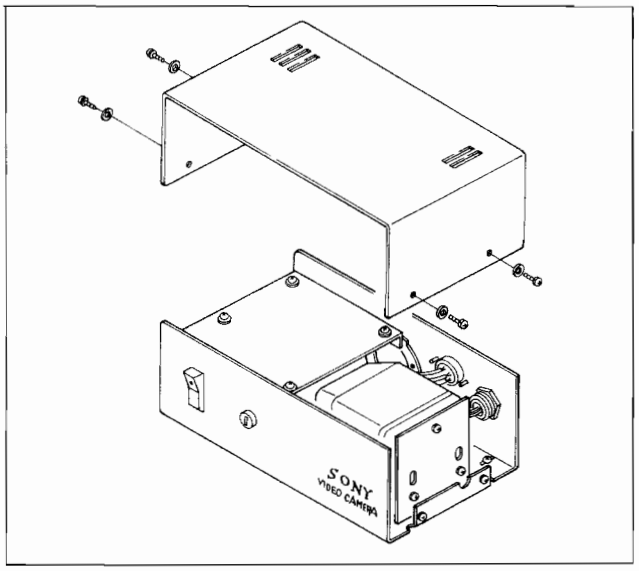



*Fig. 2-3. Power unit disassembly*

1. Remove the four screws and the polyethylene washers as shown in Fig. 2-3. Then the cover can be removed.
2. For checking the parts on the PW-5 Board, remove the four screws holding the board.

## 3. PREPARATION FOR ADJUSTMENT

### 3-1. Equipments Required

1. Volt-Ohm-meter (20 kΩ/V).
2. Oscilloscope
3. B/W monitor TV
4. Frequency counter
5. Tripod
6. Lens (F16 mm with iris control)
   Optional standard lens (automatic iris-servo control lens type JF1614EA-II)
7. SONY test pattern: 180 mm x 240 mm
   (SONY Part No. 3-701-397-00)
8. Lighting equipments

### 3-2. Connections

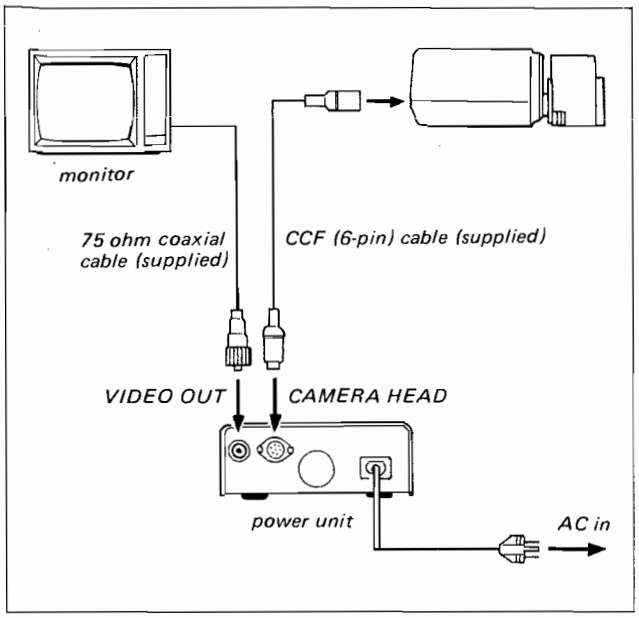



*Fig. 3-1. Connections*

## 4. PICK-UP TUBE REPLACEMENT

Replace the pickup tube according to the following procedures.

1. Remove the lens from the camera. Remove the upper, lower, and front covers, and the shield cover. (Refer to "Camera Head Unit Disassembly" in sec. 2-1.)
2. Remove the four screws holding the lens mount and remove the mount, as shown in Fig. 4-1.
3. Pull out the H Board slowly into the rear of the camera to unplug the pickup tube from the 7P socket. Push the tube out into the front of the camera, and remove the tube from the camera.
4. Check that there is not a scratch nor dust on the faceplate of a replacement tube. Also check that the pins are straight.
5. Make a note of and write down the value of the recommended target voltage that is stamped on side glass of the tube. This value is important for the target voltage setting.
6. Insert the pickup tube into the deflection coil so that the index pins of the tube is positioned in the direction as shown in Fig. 4-1 and plug the tube into the socket securely.
7. Install the lens mount and attach the lens. Then proceed to the adjustments.

<CAUTION>

When a new pickup tube (SONY Part No. 1-525-182-00) is used for replacing the tube in the units bearing serial numbers 10,001 thru 10,060 (USA/CND), short circuit between TH2 and TH3 on the PA-1 Board. The tube type E5195A CHALNICON used in the units of serial No. 10,001 thru No. 10,060 were different from the tube type S4102 NEWVICON used in the sets of serial No. 10,061 and higher.

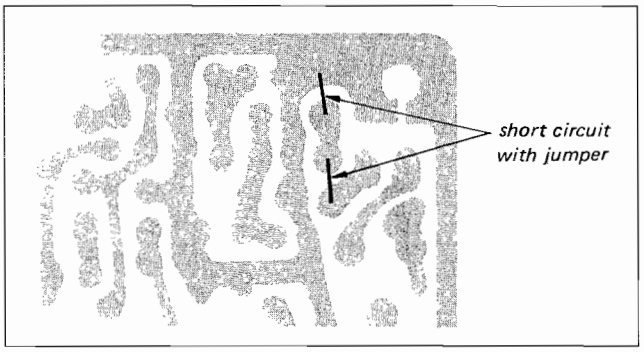



*Fig. 4-2. PA-1 board*

## 5. DEFLECTION WAVEFORM CHECK

This check is not necessary if it is confirmed that the deflection circuit of the camera functions normally.

1. Turn R2 (BEAM) on the PA-1 Board fully clockwise ↻ so that the electron beam is cut off.
2. Verify that the deflection waveforms are present as shown in Fig. 5-1.

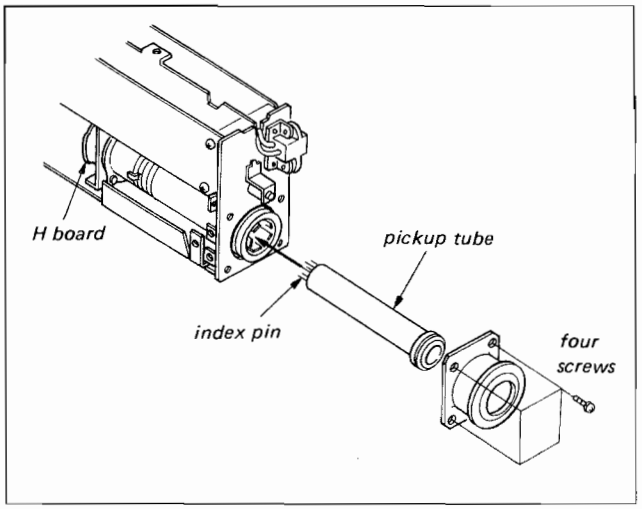



*Fig. 4-1. Pickup tube replacement*

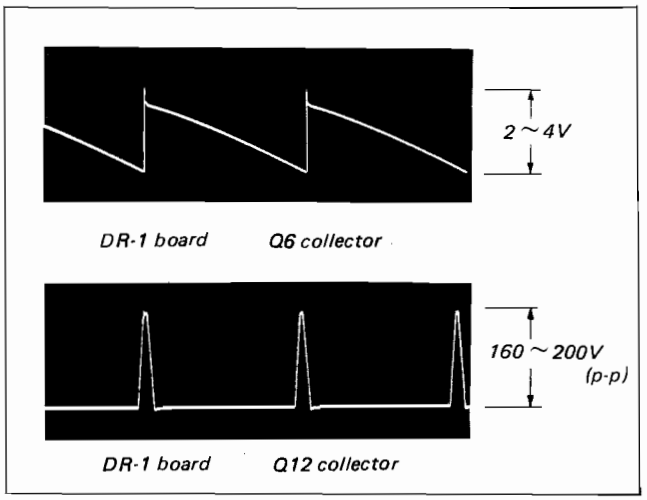



*Fig. 5-1. Deflection waveforms*

## 6. OPTICAL SYSTEM ADJUSTMENT (mechanical back focus adjustment)

1. Point the camera at a distant object of more than 15 meters apart.
2. Set the lens focal distance control to infinity. Adjust R7 (FOCUS) on the PA-1 Board for the sharpest possible picture on the monitor.
3. Insert the tip of a flat (–) head screwdriver into the slit on the lens mount as shown in Fig. 6-1. Turn the flat (–) head screw driver clockwise or counterclockwise slowly around the lens mount using the screwdriver, for the sharpest possible picture on the monitor. Repeat steps 2 and 3.

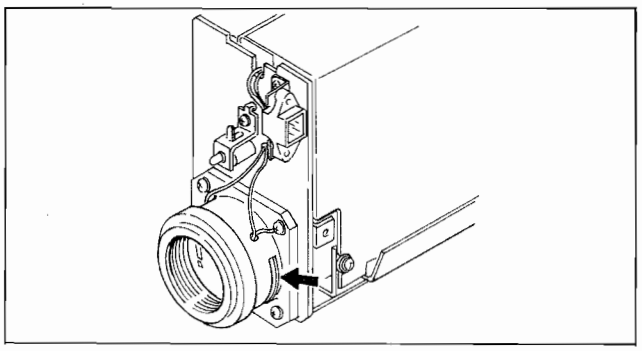


*Fig. 6-1. Flange back adjustment*

## 7. POWER SUPPLY ADJUSTMENTS

### 7-1. Camera Head Unit Power Supply Adj.

1. Connect a VOM across the fastening screw of the Q15 collector and GND on the DR-1 Board. Adjust R61 on the same board for a 14.5 ± 0.2 V reading.
2. Connect a VOM across the Q15 emitter and GND on the DR-1 Board. Adjust R56 for a 12.0 ± 0.2 V reading.

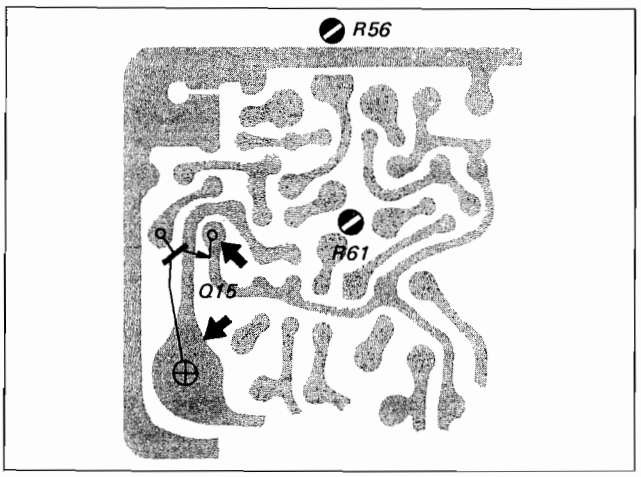



*Fig. 7-1. DR-1 board*

### 7-2. Supply Voltage Adjustment of Power Unit

1. Connect a VOM across the circuit pattern marked with (11) and GND on the PW-5 Board. Adjust R12 on the PW-5 Board for a 12.0 ± 0.2 V reading.

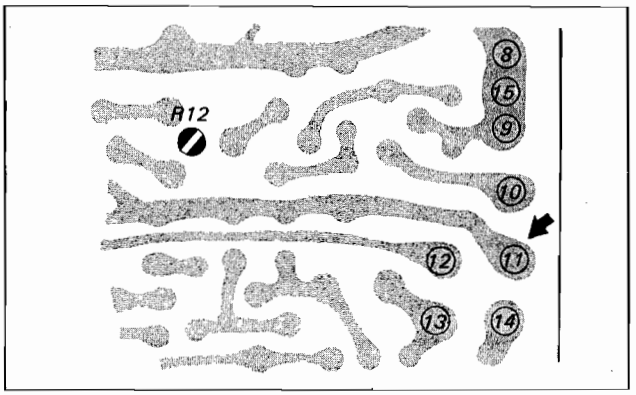



*Fig. 7-2. PW-5 board*

## 8. DEFLECTION SYSTEM ADJUSTMENTS

A monitor must have the normal horizontal and vertical scan sizes, and good linearity for making this deflection system adjustments. The monitor scan size can be adjusted by playing back the monoscope portion of the SONY alignment tape by a VTR. The monitor should preferably be set to the reduced scan mode.

### 8-1. Deflection Yoke Tilt ADjustment

1. If the monitor picture is tilted on the monitor screen, loosen the two diagonal screws shown in Fig. 8-1 fixing the DY and turn the DY until the picture is not tilted.
2. Tighten the screws loosened in Step 1 and verify that the picture is not tilted after tightening the screws.

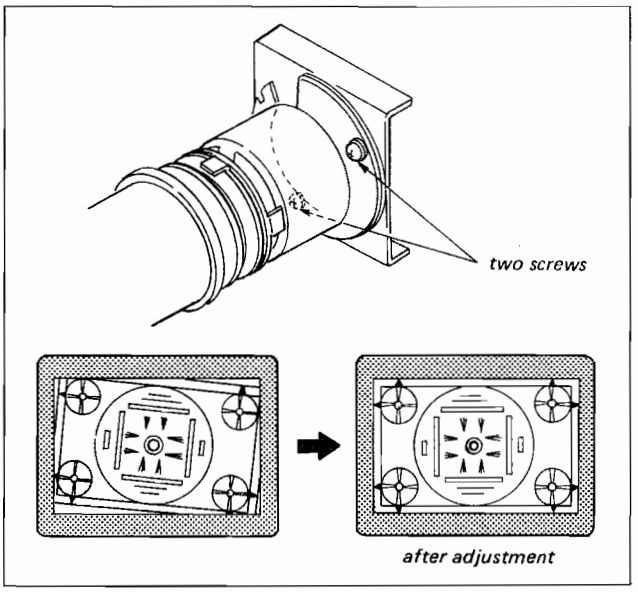



*Fig. 8-1. DY tilt adjustment*

### 8-2. Sync Generator Frequency Adjustment

1. Turn on the camera and leave it for warmup for several minutes.
2. Connect the frequency counter to the Q6 collector on the DR-1 Board. Adjust L1 on the DR-1 Board for a counter reading of 15734 ± 5 Hz.

## 8-3. Alignment Magnet Adjustment

1. Point the camera to any object of good contrast. Position the camera on a tripod so that the image of the object is positioned at the center of the monitor screen, and adjust the lens focus control for optimum focus.

2. Turn an alignment magnet according to the following steps so that the object image remains staying in the center of monitor screen (within 5%) even when R7 (FOCUS) on the PA-1 Board is turned 45 degrees clockwise and then 45 degrees counterclockwise.

   (1) While holding one of the two alignment magnets with finger securely shown in Fig. 8-2, turn the other magnet slightly to find the point where the object (in the center of the monitor screen) shift is within 5% of the monitor size even though R7 (FOCUS)/PA-1 is turned 45° ↻ and is then turned 45° ↺.

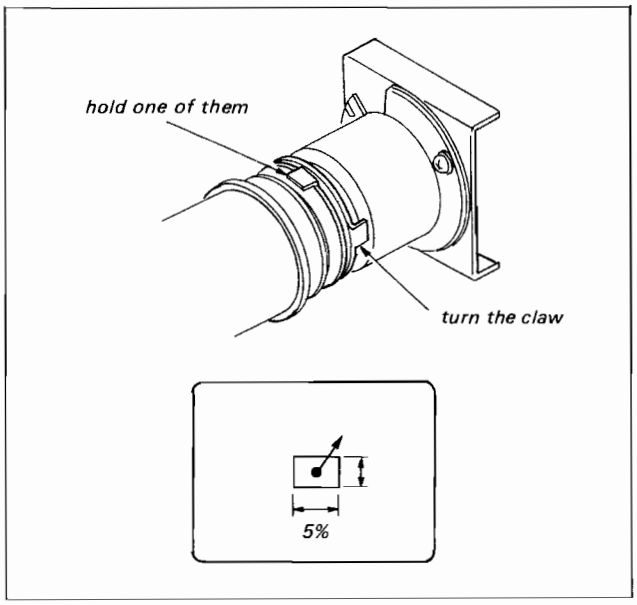



*Fig. 8-2. Alignment magnet adjustment*

   (2) If the alignment magnet adjustment for object shift within 5% cannot be attained even after the magnet is turned 360 degrees, turn the other magnet that has been fixed for about 45 degrees and repeat Step (1).

   (3) Repeat Steps (1) and (2) until the alignment magnet adjustment is complete.

3. Adjust R7 [FOCUS] on the PA-1 Board for the sharpest focus.

## 8-4. Centering Adjustment

Adjustment with use of the target ring of the pickup tube

1. Adjust L3 [H. SIZE], R15 [V. SIZE], and R12 [V. LINEAR'Y] on the DR-1 Board for enlarging the deflection size so that the four corners of the monitor screen shows the black shade of the target ring as shown in Fig. 8-3.

2. Adjust R44 (H-CENTERING) and R24 (V-CENTERING) on the DR-1 Board so that the black shades are displayed equally in the four corners of the picture, as shown in Fig. 8-3.

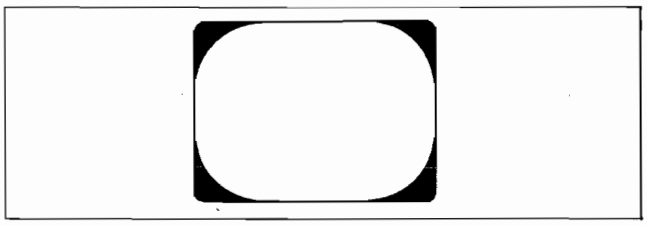


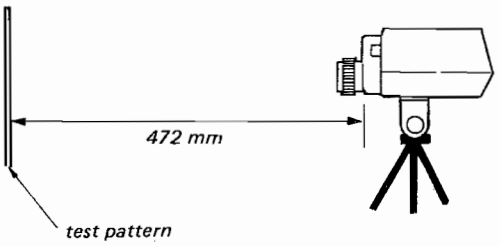
*Fig. 8-3. Centering adjustment*

Adjustment with the zoom lens

1. Point the camera with the zoom lens to any object, having good contrast. Adjust the camera position on a tripod so that the object is positioned in the center of the monitor screen.

2. Adjust R44 (H-CENTERING) and R24 (V-CENTERING) on the DR-1 Board so that the object image in the center of the screen remains staying at the same position even if the lens zoom control is continuously changed between the tele position and the wide position.

## 8-5. Horizontal Size Adjustment




When the standard lens of f = 16 mm is used together with the test pattern of 180 mm x 240 mm as listed by sec. 3-1 Equipment Required, place the camera 472 mm far from the pattern, as shown.
When an another size test pattern or a lens with a different f value is used for this adjustment, the distance can be calculated by the following equation.

$$\text{Distance (mm)} = \frac{f\,(H + 6.3)}{6.3} + \frac{f\,(H + 6.3)}{H} - 17.526$$

where f : focal length (mm) of lens
H : vertical size (mm) of test pattern

*Fig. 8-4. Standard shooting state*

1. Point the camera to the test pattern at the distance obtained by the equation in Fig. 8-4.

2. Adjust L3 [H. SIZE] on the DR-1 Board so that the whole horizontal width is equal to the horizontal width of the monitor screen.

## 8-6. Vertical Size and Linearity Adjustment

1. Adjust R12 (V-LINE) and R15 (V-SIZE) on the DR-1 Board in the same set-up as in Fig. 8-4 so that linearity of the monitor picture is best and the vertical width of the test pattern image fills the vertical width of the monitor screen.

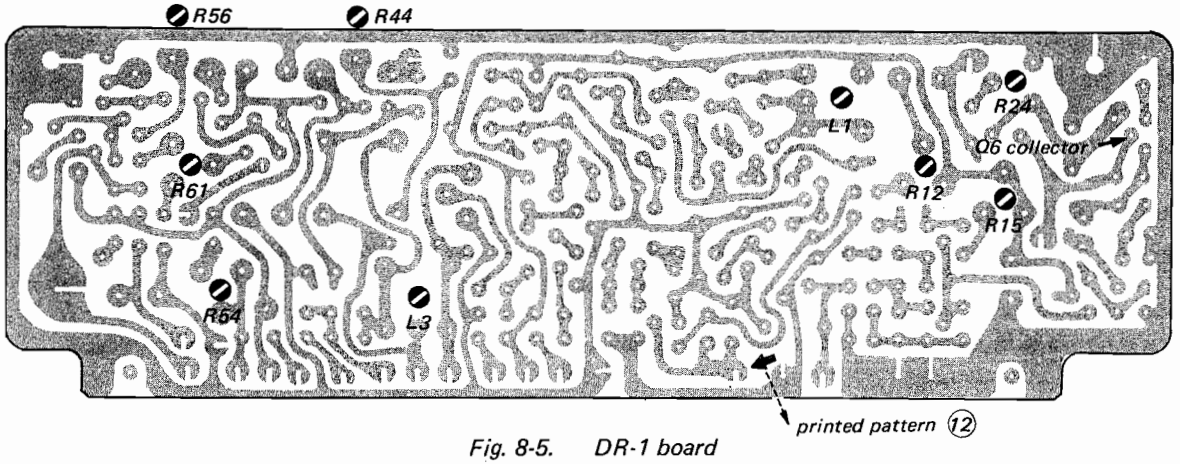



*Fig. 8-5. DR-1 board*

## 9. VIDEO SYSTEM ADJUSTMENTS

Illuminate the test pattern in the setup shown in Fig. 8-4 with 600 lux for this adjustment. (Two 100 W lamps positioned one meter from the pattern will provide adequate lighting.) Prior to this alignment, be sure to turn R42 (CABLE COMP) on the PW-5 Board and R48 (AGC) on the PA-1 Board fully counterclockwise, looking from the pattern conductor side of the boards.

### 9-1. Sync Level Adjustment

1. Observe the VIDEO OUT waveform of the power unit with the oscilloscope.

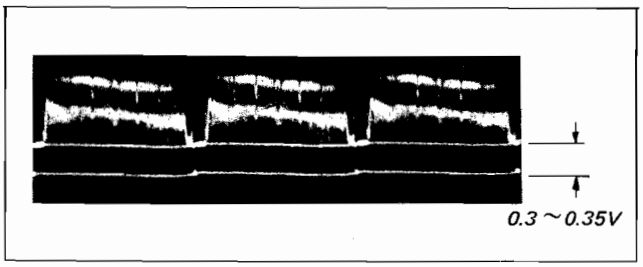



*Fig. 9-1.*

2. Adjust R53 on the PA-1 Board so that the sync level shown in Fig. 9-1 is 0.3 ~ 0.35 V.

### 9-2. Beam Adjustment

1. Connect the probe of the oscilloscope to the Q6 emitter pattern on the PA-1 Board.
2. Open the lens iris fully. Adjust R2 (BEAM) on the PA-1 Board for a video level of 0.4 ± 0.1 V(p-p).
3. Adjust the lens iris for a normal picture on the monitor.

### 9-3. Target Voltage Adjustment

Since this model has employed two different types of high sensitive vidicons, the alignment procedures of the target voltage are different depending on the type of the vidicon.

| | |
|---|---|
| CHALNICON (E5195A) | Used in the units bearing serial numbers 10,001 to 10,060 (USA/CND). |
| NEWVICON (S4102) | Used in the units bearing serial number 10,061 and higher (USA/CND). |

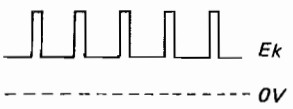
If the pickup tube in a unit whose serial number is in the numbers from 10,001 thru 10,060 is replaced with the new pickup tube, the NEWVICON target voltage adjustment must be applied.

CHALNICON (E5195A)

1. Shoot a white object with the camera after the adjustment of Section 9-2 is completed.
2. If a black and white reversed picture is observed in the white section, turn R26 on the PA-1 Board counterclockwise ↺, looking from the printed pattern side, until the reversed picture disappears completely.
   Even if the reversed picture does not appear, the target voltage must be adjusted because sometimes the voltage is beyond the optimum value. Turn R26 clockwise and verify that the reversed picture appears. Then turn R26 counterclockwise and set it to the point where the reversed picture disappears.
3. Repeat the beam adjustment mentioned in Section 9-2 again.

NEWVICON S4102

1. Measure the dc voltage at printed pattern (12) on the DR-1 Board with the oscilloscope.
2. Connect the VOM to the center terminal (movable arm) lug of R26 on the PA-1 Board. Adjust R26 for the target voltage calculated by the following equation.




Target set voltage (V) = Esj(V) + Ek(V) ,

where Esj : Recommended value of target voltage stamped on the pickup tube side glass.
Ek : Dc voltage measured at pattern (12) on DR-1 Board.

3. Perform the adjustment described in Section 9-2 again.

## 9-4. Focus Adjustment

1. Adjust the focus ring of the lens for the best focus while observing the picture on the monitor.
2. Adjust R7 on the PA-1 Board for the sharpest possible picture on the monitor.
3. Repeat Steps 1 and 2.

## 9-5. Dark Level (Pedestal) Adjustment

The procedures for this adjustment are also different depending on the type of a pickup tube used, as the ones of the target voltage adjustment.

CHALNICON E5195A

1. Place the cap on the lens to shut-off all incoming light.
2. Connect the probe of the oscilloscope to the VIDEO OUT connector of the power unit. Adjust R54 (DARK) on the DR-1 Board for a video level of 50 mV to 80 mV.

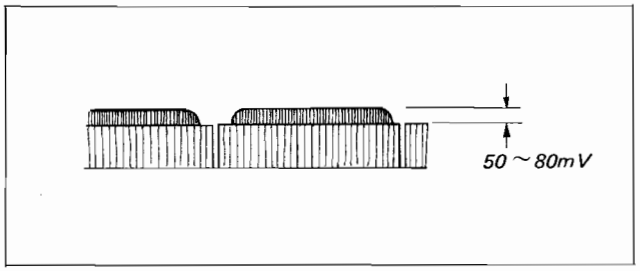



*Fig. 9-2. Dark level adjustment*

NEWVICON (S4102)

1. Put the cap on the lens to prevent all incoming light.
2. Connect probe of the oscilloscope to the Q6 emitter on the PA-1 Board. Adjust R54 (DARK) on the DR-1 Board for a 18 ± 2 mV(p-p) reading.

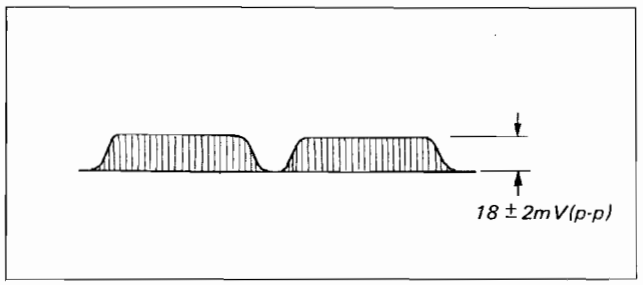



*Fig. 9-3. Dark level adjustment*

## 9-6. AGC Adjustment

1. Connect probe of the oscilloscope to the VIDEO OUT of the power unit.
2. Adjust the lens iris for a video level of 0.35 ± 0.05 V.
3. Turn R48 (AGC) on the PA-1 Board slowly from its fully counterclockwise position and set it to the point where the video level is beyond 0.4 V.
4. Then turn R48 counterclockwise gradually and stop the turning when the video level returns to the original value.

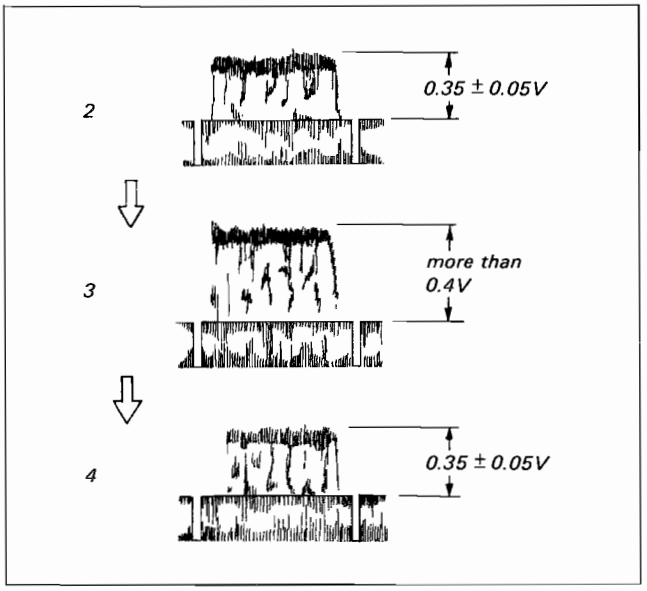



*Fig. 9-4. AGC adjustment*

## 9-7. White Clip Adjustment

1. Connect probe of the oscilloscope to the VIDEO OUT of the power unit.
2. Shoot a bright subject such as fluorescent lamp and verify that the VIDEO OUT waveform is $1.3^{+0}_{-0.1}$ V(p-p).
3. If the above specification is not obtained, change the value of R49 on the PA-1 Board.
   If, for example, a 4700 Ω resistor is mounted for R49,

| | | |
|---|---|---|
| more than 1.7 V(p-p) | . . . . . | Change it to 6,800 Ω |
| 1.5 to 1.7 V(p-p) | . . . . . | Change it to 6,200 Ω |
| 1.4 to 1.5 V(p-p) | . . . . . | Change it to 5,600 Ω |
| 1.3 to 1.4 V(p-p) | . . . . . | Change it to 5,100 Ω |

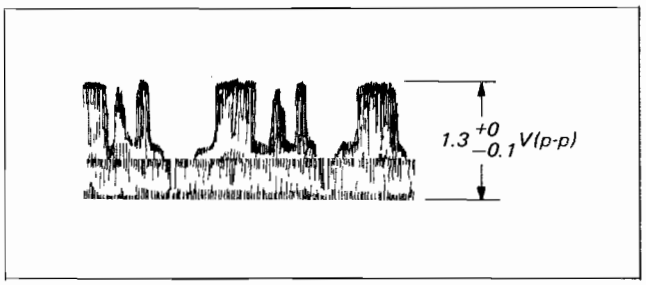



*Fig. 9-5. White clip adjustment*

## 9-8. Cable Compensation Adjustment

1. Connect the camera head and the power unit with a 5 meter CCF cable and point the camera to the test pattern.
2. Connect probe of the oscilloscope to the VIDEO OUT of the power unit.
3. Turn R42 on the PW-5 Board slowly from the fully counterclockwise position and stop turning it when the video level starts increasing.
4. Then turn R42 counterclockwise slowly and stop turning when the original video level is restored.

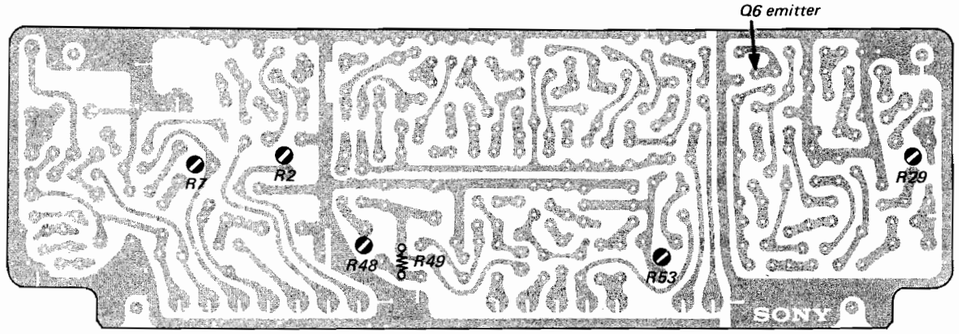



*Fig. 9-6. PA-1 board*

## 10. AUTOMATIC SERVO-CONTROLLED IRIS LENS ADJUSTMENT

1. Mount the automatic aperture lens (JF-1614EA-II) and point the camera to any object, having a good contrast.
2. Remove the cap "A" on the lens body and adjust the variable resistor in the lens shown in Fig. 10-1 for 1.0 ± 0.1 V(p-p) while observing the VIDEO OUT of the power unit.

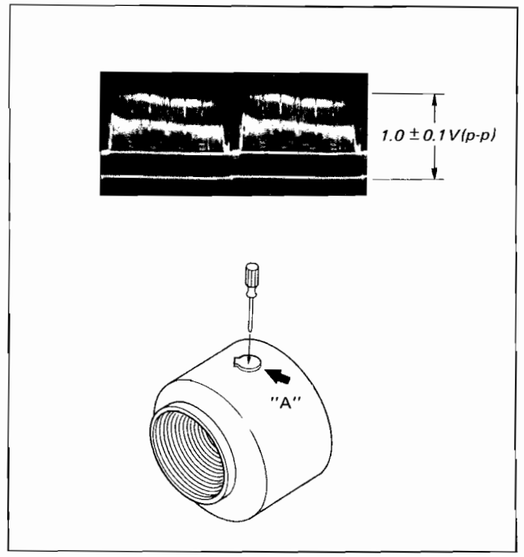
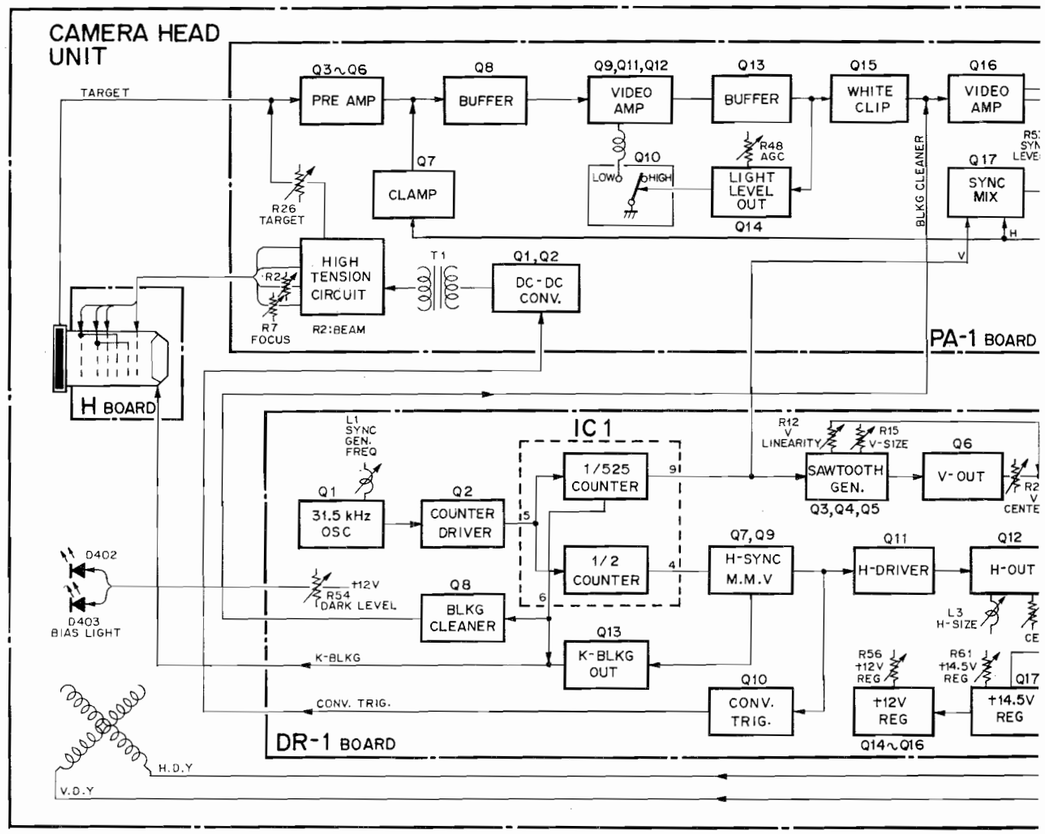



*Fig. 10-1. Automatic servo controlled iris lens adjustment*



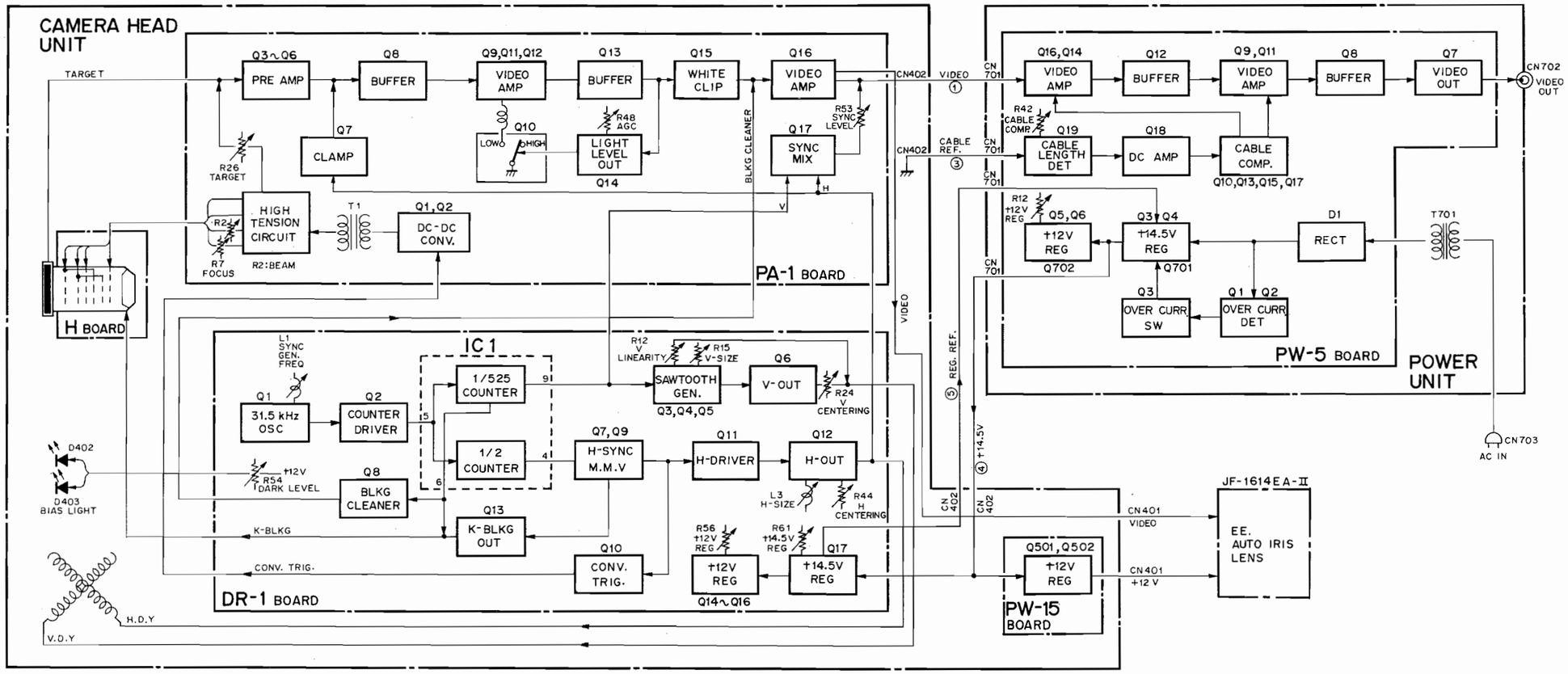
# SECTION 2
# PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

## BLOCK DIAGRAM



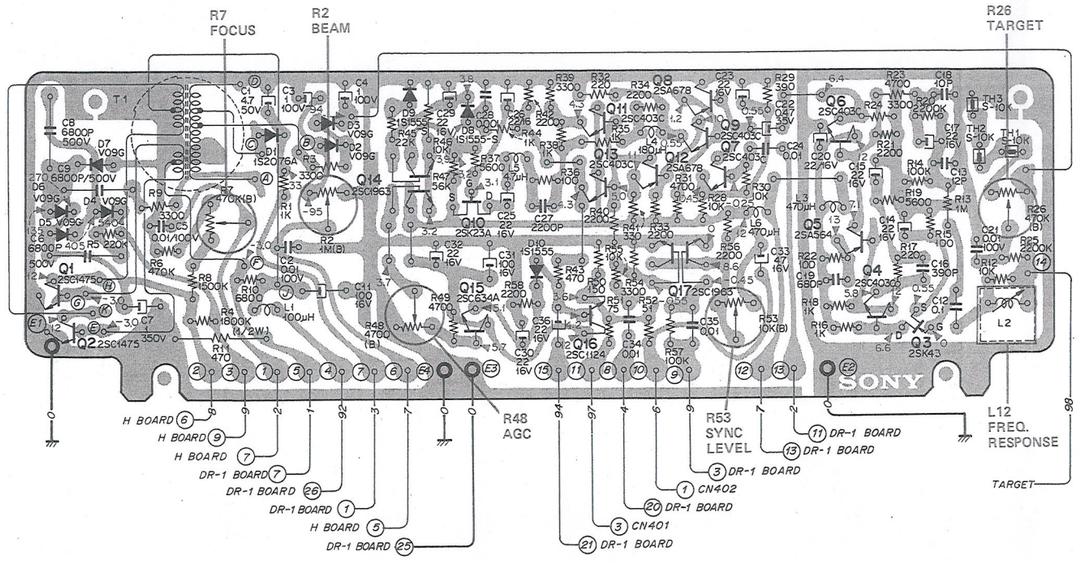
# SECTION 2
# PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

## BLOCK DIAGRAM



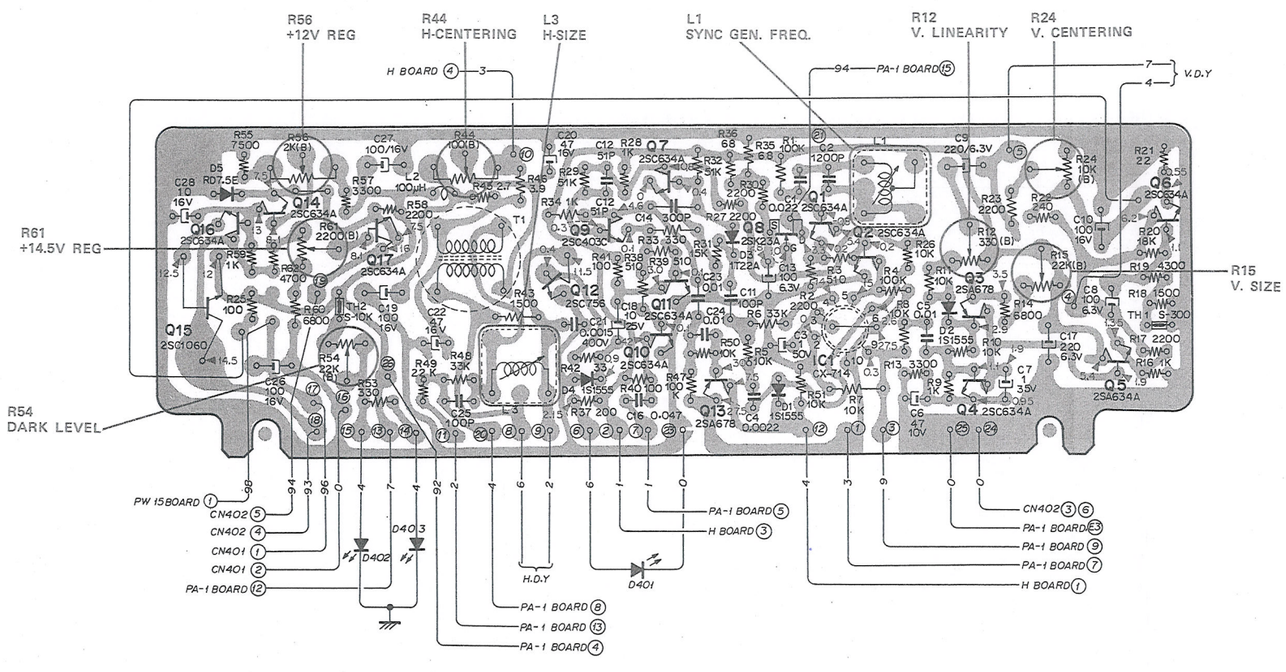
## PRINTED WIRING BOARD

### PA-1 BOARD REF. No. 200 SERIES

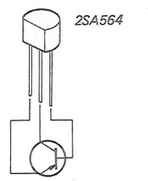


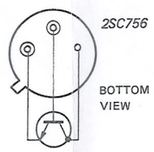

**NOTE:**
SERIAL NO. 10,061 AND HIGHER:
THERMISTORS TH2 AND TH3 ARE SHORTED ON THE PA-1 BOARD.

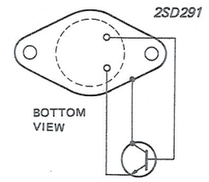
### DR-1 BOARD REF. NO. 300 SERIES

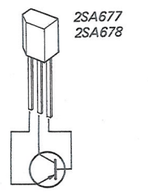


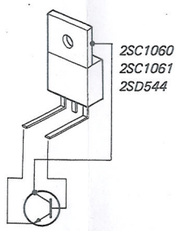


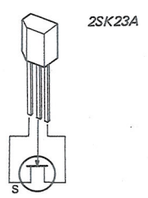



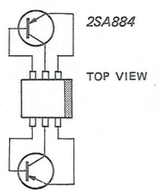



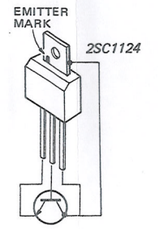



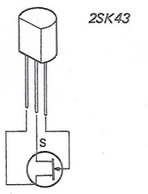



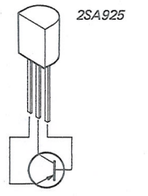



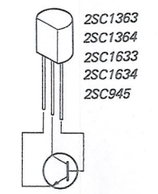



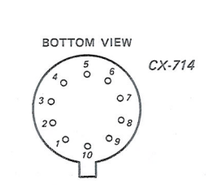



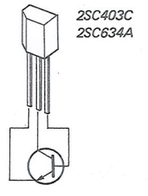



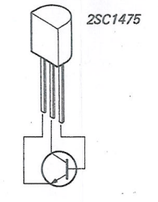



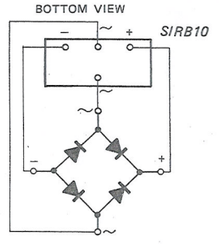



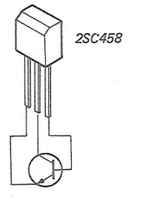



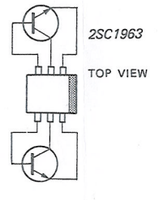



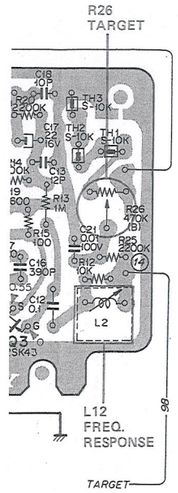



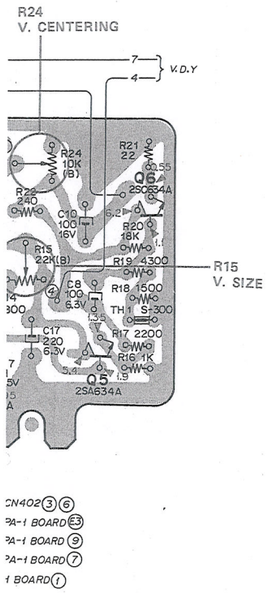

H BOA

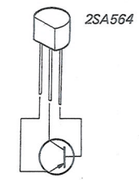
DR-1 BOARD 10
DR-1 BOARD 2

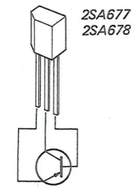
PA-1 BOARD 3
DR-1 BOARD 12

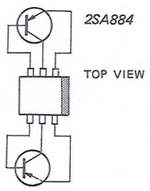


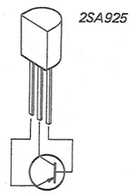

GHER:
H3 ARE SHORTED ON THE

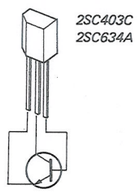


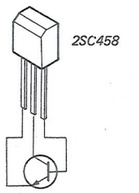



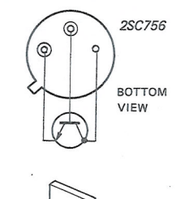



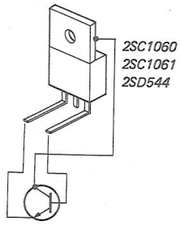



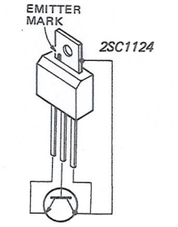



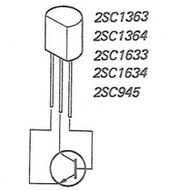



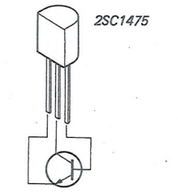



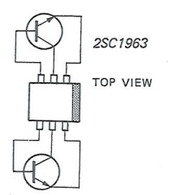



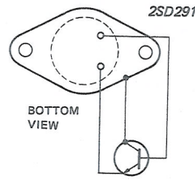



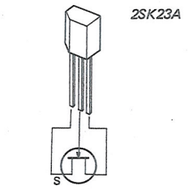



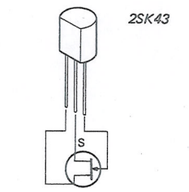



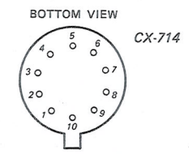



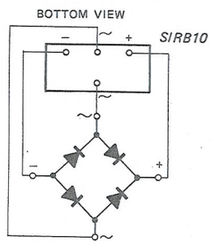



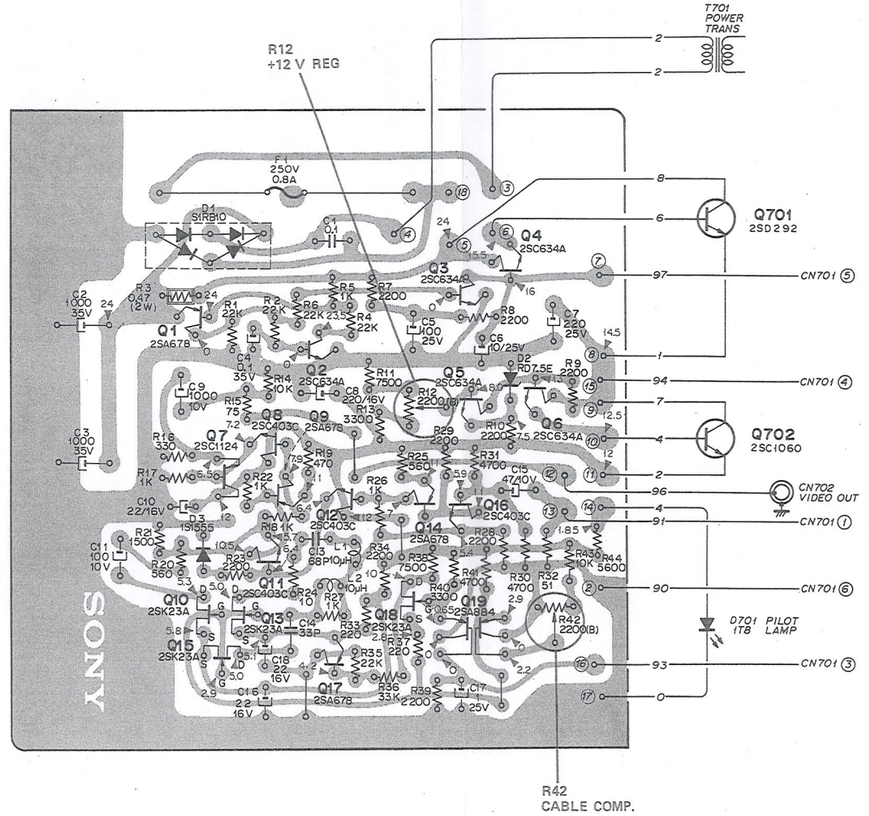



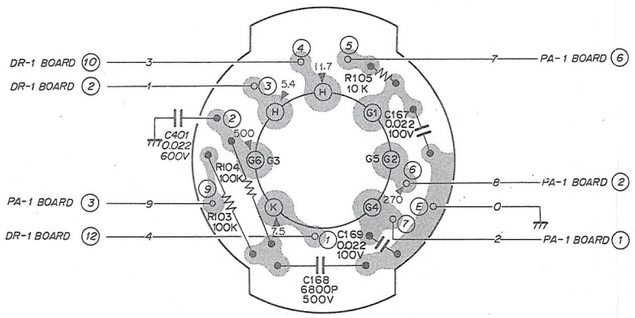





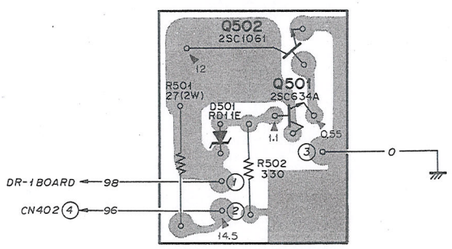


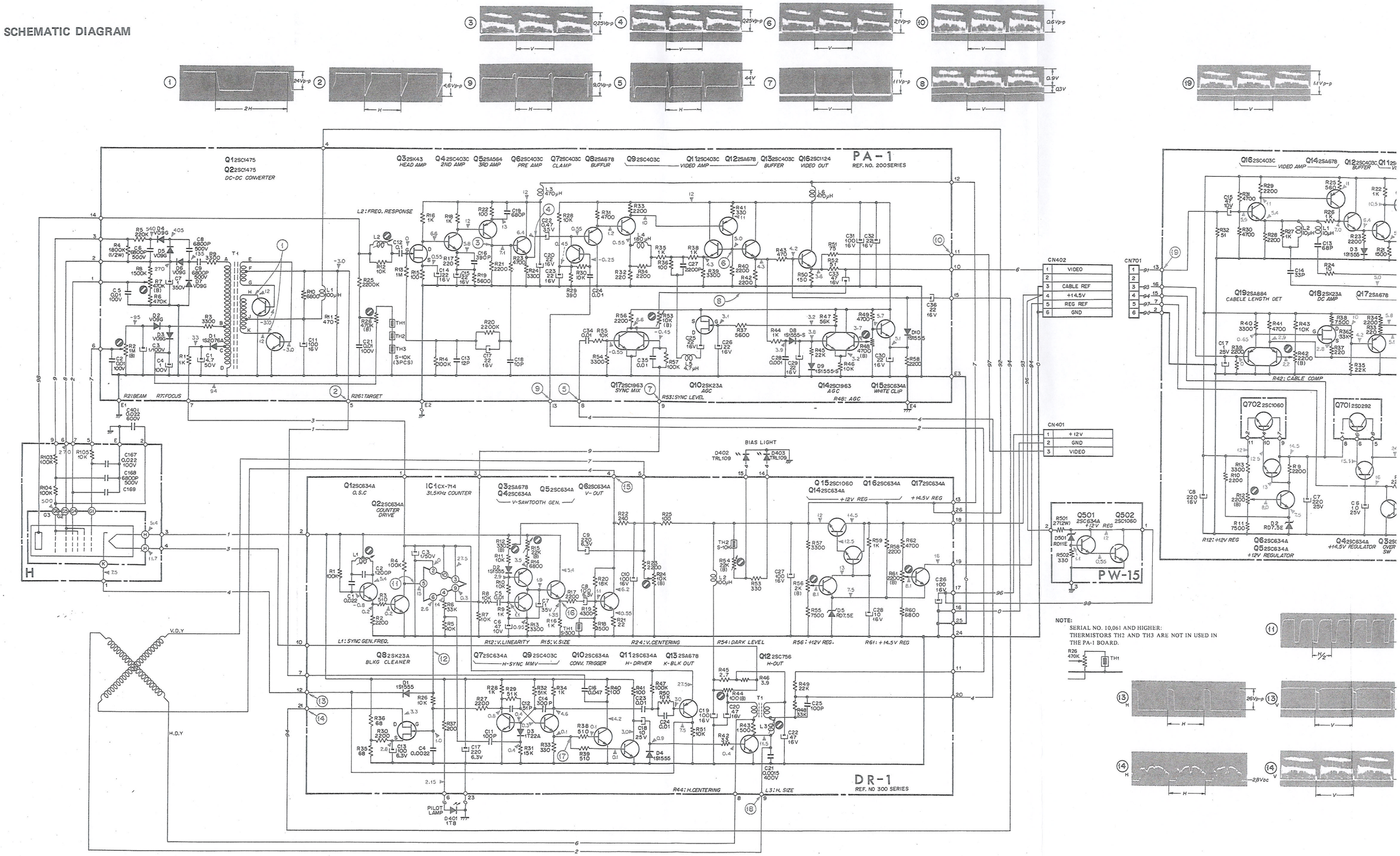

H BOARD

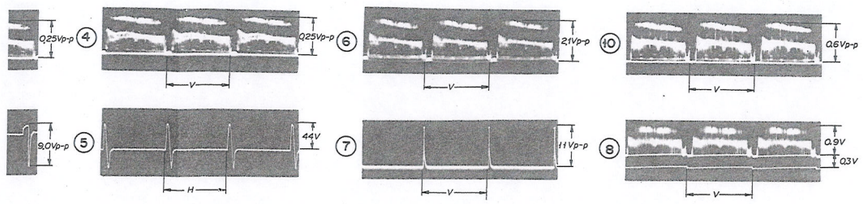



PW-15 BOARD

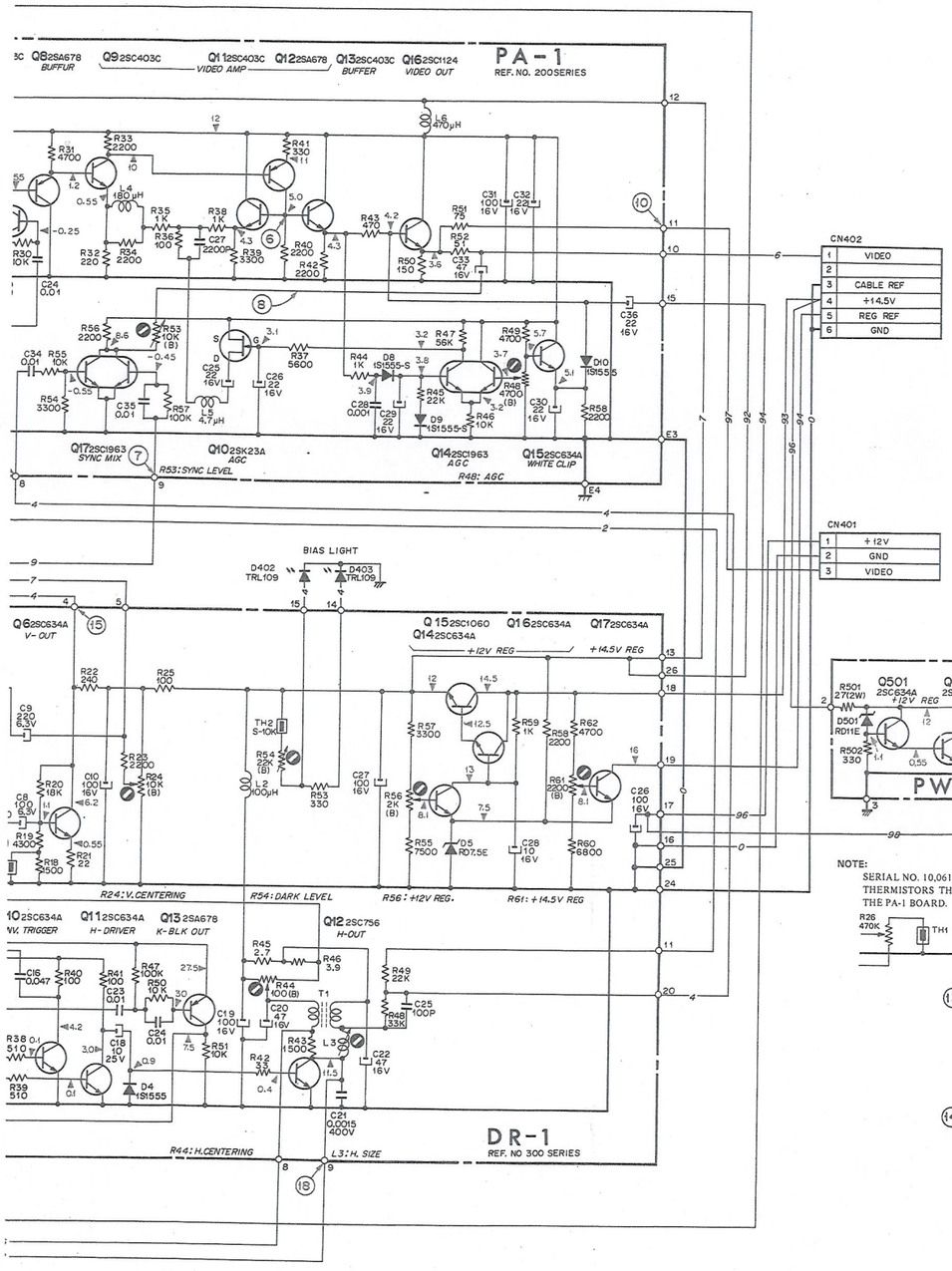


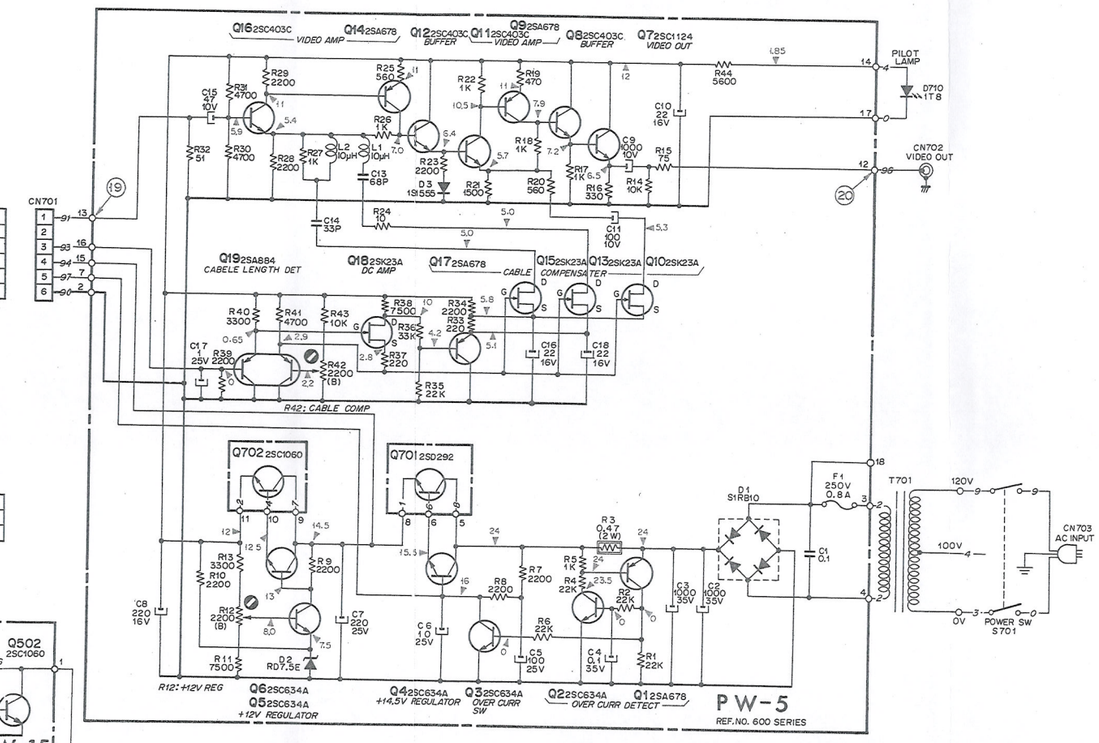
## SCHEMATIC DIAGRAM

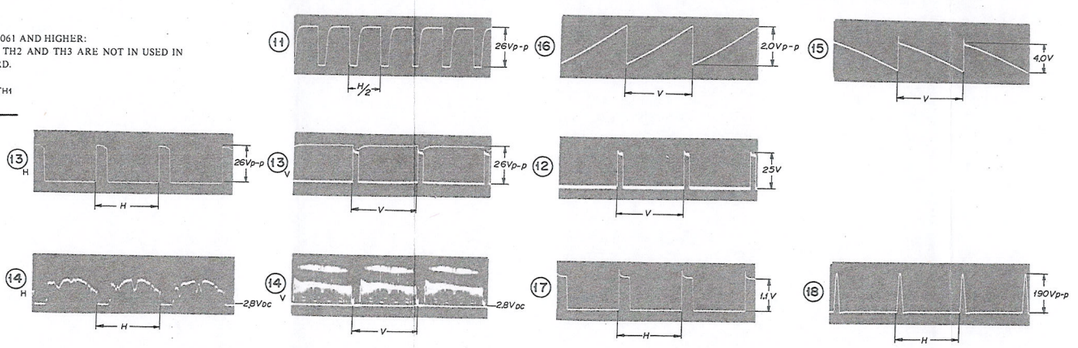



0.25Vp-p
4
0.25Vp-p
6
2Vp-p
10
0.6Vp-p
V
9.0Vp-p
5
44V
H
7
11Vp-p
8
0.9V
0.3V

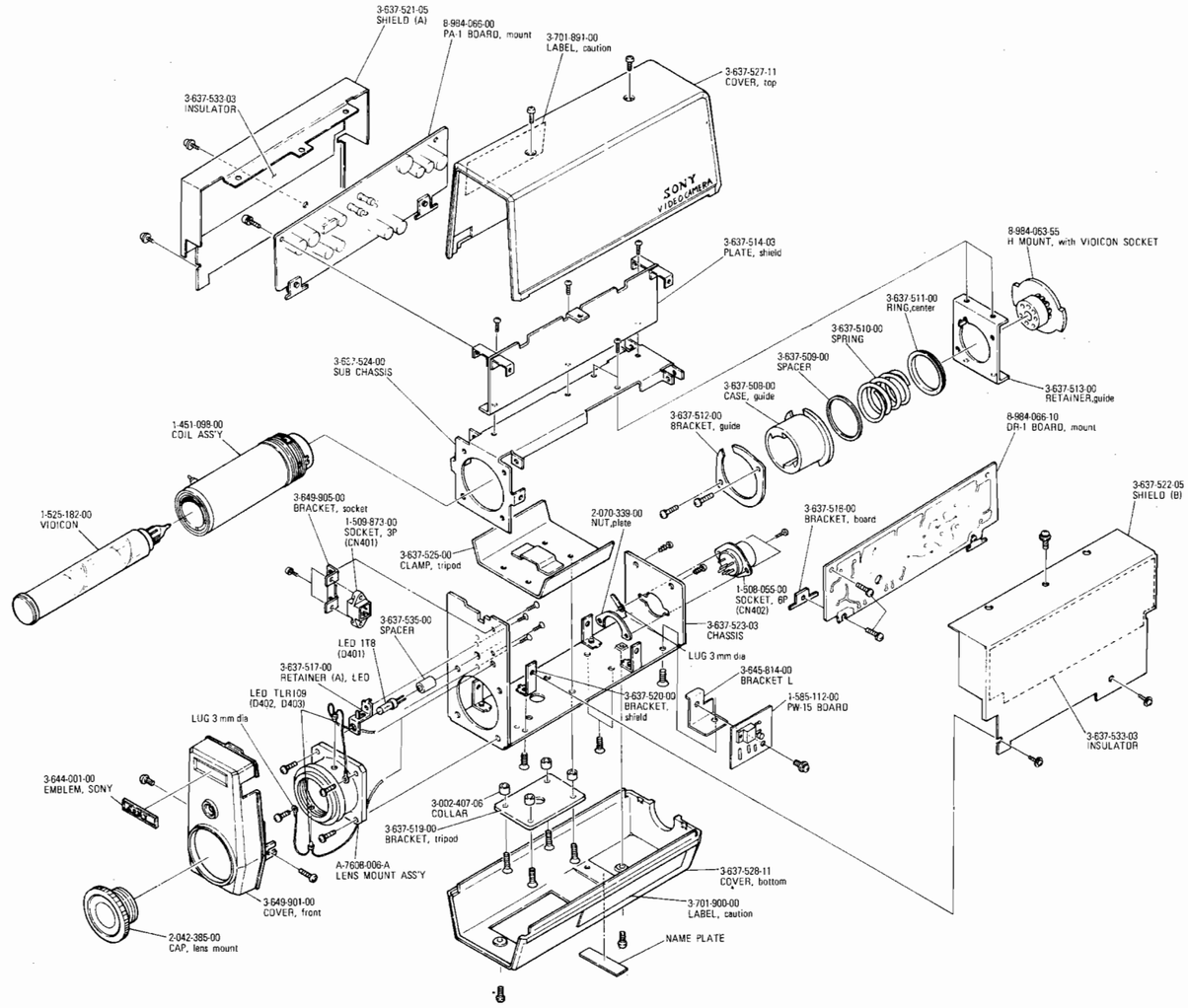

19
1.1Vp-p
20
1.0Vp-p
V


PA-1
REF. NO. 200SERIES
Q8 2SA678 BUFFUR
Q9 2SC403C
Q11 2SC403C VIDEO AMP
Q12 2SA678
Q13 2SC403C BUFFER
Q16 2SC1124 VIDEO OUT
CN402
1 VIDEO
2
3 CABLE REF
4 +14.5V
5 REG REF
6 GND
CN401
1 +12V
2 GND
3 VIDEO
BIAS LIGHT
D402 TRL109
D403 TRL109
Q6 2SC634A V-OUT
Q15 2SC1060
Q16 2SC634A
Q17 2SC634A
Q14 2SC634A
+12V REG
+14.5V REG
R24: V. CENTERING
R54: DARK LEVEL
R56: +12V REG.
R61: +14.5V REG
Q10 2SC634A V. TRIGGER
Q11 2SC634A H-DRIVER
Q13 2SA678 K-BLK OUT
Q12 2SC756 H-OUT
R44: H. CENTERING
L3: H. SIZE
DR-1
REF. NO 300 SERIES
Q501 2SC634A +12V REG
Q502 2SC1060
PW-15
NOTE:
SERIAL NO. 10,061 AND HIGHER:
THERMISTORS TH2 AND TH3 ARE NOT IN USED IN THE PA-1 BOARD.
R26 470K
TH1

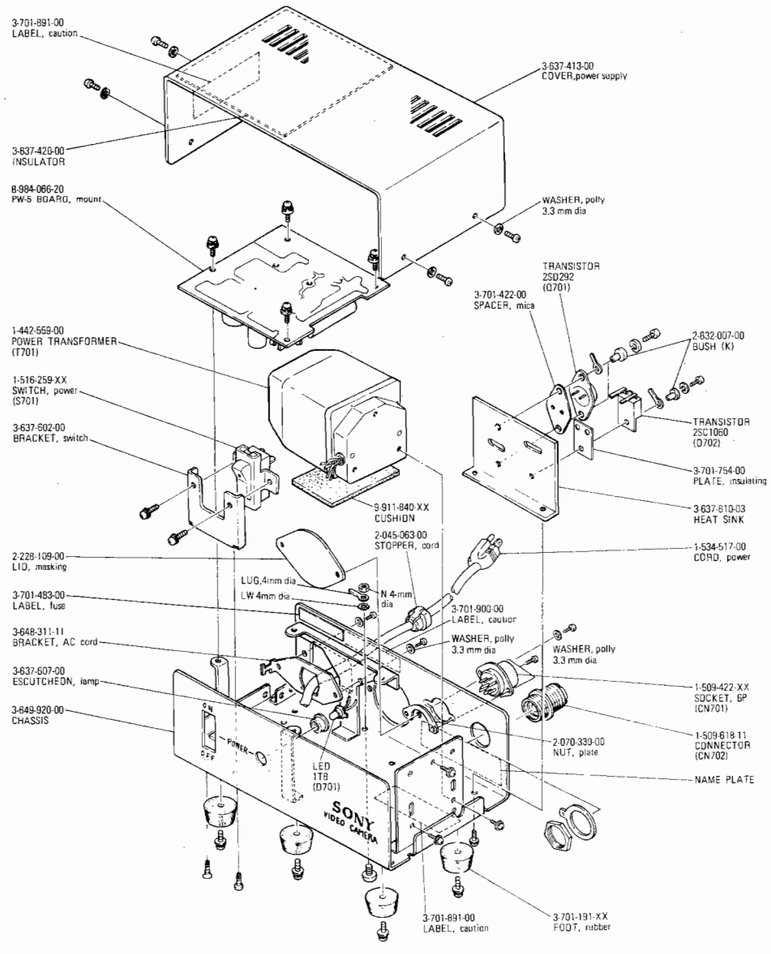

Q16 2SC403C VIDEO AMP
Q14 2SA678
Q12 2SC403C BUFFER
Q11 2SC403C VIDEO AMP
Q9 2SA678
Q8 2SC403C BUFFER
Q7 2SC1124 VIDEO OUT
PILOT LAMP
D710 LTB
CN702 VIDEO OUT
CN701
Q19 2SA884 CABELE LENGTH DET
Q18 2SK23A DC AMP
Q17 2SA678
CABLE COMPENSATER
Q15 2SK23A
Q13 2SK23A
Q10 2SK23A
R42: CABLE COMP
Q702 2SC1060
Q701 2SD292
T701
120V
100V
0V
CN703 AC INPUT
POWER SW S701
F1 250V 0.8A
D1 S1RB10
Q6 2SC634A
Q5 2SC634A +12V REGULATOR
Q4 2SC634A +14.5V REGULATOR
Q3 2SC634A OVER CURR SW
Q2 2SC634A OVER CURR DETECT
Q1 2SA678
PW-5
REF. NO. 600 SERIES
R12: +12V REG


11
26Vp-p
H/2
16
2.0Vp-p
V
15
4.0V
13 H
26Vp-p
H
13 V
26Vp-p
12
25V
14 H
2.8Vdc
14 V
2.8Vdc
17
1.1V
18
190Vp-p

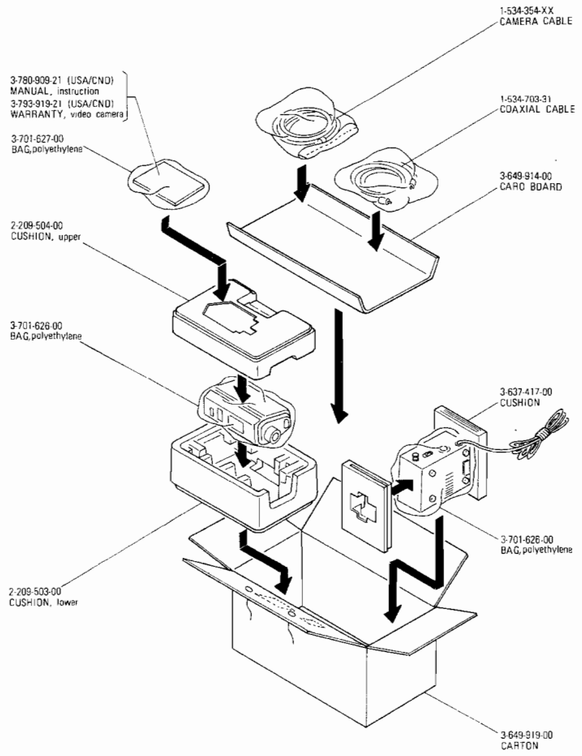
## CAMERA HEAD UNIT




## POWER UNIT




## PACKING



## ELECTRICAL PARTS

### Mounted Board

| Part No. | Description |
|---|---|
| 8-984-063-55 | H board |
| 8-984-066-00 | PA-1 board |
| 8-984-066-10 | DR-1 board |
| 8-984-066-20 | PW-5 board |

### Printed Circuit Board

| Part No. | Description |
|---|---|
| 1-585-112-00 | PW-15 board |

### Capacitors

Standard electrolytic capacitors (less than 1000μF), mylar capacitors (less than 200WV) and ceramic capacitors (less than 50WV) are not listed. All capacitors are in micro farads unless otherwise indicated.

H board

| Ref. No. | Part No. | | | |
|---|---|---|---|---|
| C168 | 1-102-267-11 | ceramic | 0.0068 | |

PA-1 board

| Ref. No. | Part No. | | | |
|---|---|---|---|---|
| C206 | 1-102-267-11 | ceramic | 0.0068 | |
| C208,209 | 1-102-267-11 | ceramic | 0.0068 | |
| C213 | 1-107-063-11 | mica | 12 pF | |
| C214,215 | 1-131-201-11 | tantal | 22 | |
| C217 | 1-131-201-11 | tantal | 22 | |
| C218 | 1-107-061-11 | mica | 10 pF | |
| C220 | 1-131-201-11 | tantal | 22 | |
| C222 | 1-131-213-11 | tantal | 0.47 | |
| C223 | 1-131-201-11 | tantal | 22 | 16 V |
| C225 | 1-131-201-11 | tantal | 22 | 16 V |
| C226 | 1-131-201-11 | tantal | 22 | 16 V |
| C229,230 | 1-131-201-11 | tantal | 22 | 16 V |
| C232 | 1-131-201-11 | tantal | 22 | 16 V |
| C236 | 1-131-201-11 | tantal | 22 | 16 V |

DR-1 board

| Ref. No. | Part No. | | | |
|---|---|---|---|---|
| C302 | 1-104-041-11 | styrol | 0.012 | 125 V |
| C307 | 1-131-215-11 | tantal | 1 | 35 V |
| C311 | 1-107-131-11 | mica | 100 pF | |
| C312 | 1-107-124-11 | mica | 51 pF | |
| C314 | 1-107-096-11 | mica | 300 pF | |
| C321 | 1-108-880-12 | mylar | 0.0015 | 400 V |
| C325 | 1-107-169-11 | mica | 100 pF | 500 V |

Chassis

| Ref. No. | Part No. | | | |
|---|---|---|---|---|
| C401 | 1-129-486-11 | plastic | 0.022 | 600 V |

PW-5 board

| Ref. No. | Part No. | | | |
|---|---|---|---|---|
| C604 | 1-131-209-51 | tantal | 0.1 | 35 V |
| C610 | 1-131-201-51 | tantal | 22 | 16 V |
| C613 | 1-107-081-11 | mica | 68 pF | |
| C614 | 1-107-073-11 | mica | 33 pF | |
| C616 | 1-131-201-51 | tantal | 22 | 16 V |
| C617 | 1-131-236-51 | tantal | 1 | 25 V |
| C618 | 1-131-201-51 | tantal | 22 | 16 V |

### Diodes & IC

As to the type number and parts code number of all the semiconductors, those of replacement use is shown here. Sometimes different types of semiconductor may be found in actual machine. Replacement use semiconductor and factory-installed semiconductor have complete interchangeability.

PA-1 board

| Ref. No. | Part No. | |
|---|---|---|
| D201 | | 1S2076A |
| D202~207 | | V0-9G |
| D208,209 | 8-719-815-59 | 1S1555-S |
| D210 | | 1S1555 |

| Ref. No. | Part No. | Description |
|---|---|---|
| | DR-1 board | |
| D301,302 | | 1S1555 |
| D303 | | 1T22A |
| D304 | | 1S1555 |
| D305 | | RD7.5E |
| IC301 | 8-757-140-00 | CX-714 |
| | Chassis | |
| D401 | | 1T8 |
| D402,403 | | TLR-109 |
| | PW-15 board | |
| D501 | | EQB01-11Z |
| | PW-5 board | |
| D601 | | S1RB10 |
| D602 | | RD-7.5E |
| D603 | | 1S1555 |
| | Chassis | |
| D701 | 8-710-800-00 | 1T8 |

## Inductors

| Ref. No. | Part No. | Description |
|---|---|---|
| | PA-1 board | |
| L201 | 1-407-169-XX | micro 100 μH |
| L202 | 1-407-787-00 | micro (variable) 55 μH |
| L203 | 1-407-177-XX | micro 470 μH |
| L204 | 1-407-172-XX | micro 180 μH |
| L205 | 1-407-186-XX | micro 4.7 μH |
| L206 | 1-407-177-XX | micro 470 μH |
| | DR-1 board | |
| L301 | 1-405-579-00 | coil osc |
| L302 | 1-407-169-XX | micro 100 μH |
| | PW-5 board | |
| L601,602 | 1-407-157-XX | micro 10 μH |

## Transistors

As to the number and parts code number of all the semiconductors, those of replacement use is shown here. Sometimes different types of semiconductor may be found in actual machine. Replacement use semiconductor and factory-installed semiconductor have complete interchangeability.

| Ref. No. | Part No. | Description |
|---|---|---|
| | PA-1 board | |
| Q201,202 | | 2SC1475 |
| Q203 | | 2SK43-4 |
| Q204 | | 2SC403C |
| Q205 | | 2SA564(A) |
| Q206,207 | | 2SC403C |
| Q208 | | 2SA678 |
| Q209 | | 2SC403C |
| Q210 | 8-722-354-05 | 2SK23A-540 |
| Q211 | | 2SC403C |
| Q212 | | 2SA678 |
| Q213 | | 2SC403C |
| Q214 | | 2SC1963 |
| Q215 | | 2SC634A |
| Q216 | 8-725-412-09 | 2SC1124-12 |
| Q217 | | 2SC1963 |
| | DR-1 board | |
| Q301,302 | | 2SC634A |
| Q303 | 8-727-788-00 | 2SA678-8 |
| Q304~307 | | 2SC634A |
| Q308 | 8-722-354-05 | 2SK23A-540 |
| Q309 | | 2SC403C |
| Q310,311 | | 2SC634A |
| Q312 | | 2SC756-872 |

| Ref. No. | Part No. | Description |
|---|---|---|
| Q313 | 8-727-788-00 | 2SA678-8 |
| Q314 | | 2SC634A |
| Q315 | | 2SC1061 |
| Q316,317 | | 2SC634A |
| | PW-15 board | |
| Q501 | | 2SC634A |
| Q502 | | 2SC1061 |
| | PW-5 board | |
| Q601 | | 2SA678 |
| Q602~606 | | 2SC634A |
| Q607 | | 2SC1124 |
| Q608 | | 2SC403C |
| Q609 | | 2SA678 |
| Q610 | 8-722-354-05 | 2SK23A-540 |
| Q611,612 | | 2SA403C |
| Q613 | 8-722-354-05 | 2SK23A-540 |
| Q614 | | 2SA678 |
| Q615 | 8-722-354-05 | 2SK23A540 |
| Q616 | | 2SC403C |
| Q617 | | 2SA678 |
| Q618 | 8-722-354-05 | 2SK23A540 |
| Q619 | | 2SA884 |
| | Chassis | |
| Q701 | | 2SD291 |
| Q702 | | 2SC1061 |

## Resistors

Carbon resistors in 1/2 W, 1/4 W and ±5% are omitted. All resistors are in ohms.

| Ref. No. | Part No. | | |
|---|---|---|---|
| | PA-1 board | | |
| R202 | 1-222-846-00 | adjustable | 1 M (B) |
| R206 | 1-213-208-11 | metal | 470 K |
| R207 | 1-224-134-XX | adjustable | 470 K (B) |
| R208 | 1-213-209-11 | metal | 1.5 M |
| R226 | 1-224-134-XX | adjustable | 470 K |
| R248 | 1-224-251-XX | adjustable | 4.7 K |
| R253 | 1-224-252-XX | adjustable | 10 K (B) |
| | DR-1 boare | | |
| R312 | 1-221-986-00 | adjustable | 330 (B) |
| R315 | 1-224-253-XX | adjustable | 22 K (B) |
| R324 | 1-224-252-XX | adjustable | 10 K (B) |
| R344 | 1-222-730-00 | adjustable | 100 (B) |
| R354 | 1-224-254-XX | adjustable | 4.7 K (B) |
| R356 | 1-224-643-XX | adjustable | 2 K (B) |
| R361 | 1-224-251-XX | adjustable | 4.7 K (B) |
| | PW-15 board | | |
| R501 | 1-207-911-11 | wirewound | 27 |
| | PW-5 board | | |
| R603 | 1-207-616-11 | wirewound | 0.47 |
| R612 | 1-224-250-XX | adjustable | 2.2 K (B) |
| R642 | 1-224-250-XX | adjustable | 2.2 K (B) |

## Miscellaneous

| Ref. No. | Part No. | |
|---|---|---|
| CN401 | 1-509-873-00 | 3 P Socket |
| CN402 | 1-508-055-00 | 6 P Socket |
| CN701 | 1-509-422-XX | 6 P Socket |
| CN702 | 1-509-618-11 | Connector |
| F601 | 1-532-401-XX | Fuse 0.8A |
| T201 | 1-442-017-00 | Transformer, converter |
| T301 | 1-407-721-00 | Transformer, HO |
| T701 | 1-442-559-XX | Transformer, power supply |
| TH201~203 | 1-800-202-XX | Thermistor, S-10K |
| TH301 | 1-800-071-XX | Thermistor, S-300 |
| TH302 | 1-800-202-XX | Thermistor, S-10K |
| S701 | 1-516-259-XX | Switch, seesaw |
| | 1-451-098-00 | Coil, vidicon |
| | 1-525-182-00 | Vidicon |
| | 1-526-521-XX | Socket, vidicon |
| | 1-534-354-XX | Camera Cable |
| | 1-534-517-00 | Cord, power |
| | 1-534-703-31 | Coaxial Cable |

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